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FEEDING MECHANISM FOR SINGLE THREAD SEWING MACHINES.

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FIG. 5

FIG. 6

FIG. 7

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BY

His ATTORNEYS
TO ALL TO WHOM IT MAY CONCERN:

BE IT KNOWN THAT I, JOHN BIGELOW, OF MINNEAPOLIS, MINNESOTA, HAVE INVENTED CERTAIN NEW AND USEFUL IMPROVEMENTS IN FEED MACHINERY FOR SINGLE-THREAD SEWING-MACHINES, OF WHICH THE FOLLOWING IS A SPECIFICATION.

This improvement relates to the reciprocating feed mechanism of a single-thread sewing-machine in which a looper is used for making successive forward loops of the sewing-thread and in which the raising and forward movement of the feed-dog is obtained from a single eccentric on the driving-shaft of the machine and the lowering and return movement of the feed-dog is obtained through the agency of a spring.

The object of the improvement is to furnish means for fastening the end of a seam at any point in the goods by the action of the machine itself. I find that by stopping the forward action of the feed-dog, then causing the needle to penetrate the same hole in the goods a few times, a series of loops drawn tight will be made in the air on the under or loop side of the seam, and that when the thread is broken the end pulls through the last loop and makes a secure fastening for the same. I stop the forward movement of the feed by holding the feed-dog carriage against the resilient action of the spring and sufficiently far back not to receive any forward impulse from its actuating-eccentric.

In the accompanying drawings, forming part of this specification, Figure 1 shows the under side of a single-thread seam where the feed is brought to a standstill and a few stitches are made in the air and not in the goods as a tie-off or fastening. Fig. 2 is a sectional side elevation of a Willcox & Gibbs sewing-machine feed mechanism embodying my invention. Figs. 3 and 4 are details showing the connection between the feed-dog-actuating rod and the adjusting rod or shaft. Fig. 5 is a plan of a Willcox & Gibbs sewing-machine feed mechanism embodying a simpler application of my invention. Fig. 6 is a side view of Fig. 5. Fig. 7 is a reverse side view.

In the drawings, 1 represents the needle; 2, the work-plate; 3, the machine-frame; 4, the feed-dog; 5, the feed-dog carriage; 6, the pin in the machine-frame on which one end of the feed-dog carriage is supported and on which it can move forward and back. A spring 7 has one end bearing against the pin 6 and its other end pressing against the feed-dog carriage 5. The feed-dog-actuating rod 9 is pivotally connected at 8 with the feed-dog carriage 5 and has midway of its length the lug 10, which through the reflex action of the spring 7 on the carriage 5 is kept pressed against the side of the rocker-rod 12. This rod is pivotally attached at one end 14 to the frame of the machine and has its other end pressing against and receiving a vibratory motion from an eccentric 13 on the driving-shaft of the machine. A hole 15 in the driving-shaft is where the ordinary Willcox & Gibbs looper is attached, but not shown for clearness. The free end of the actuating-rod 9 has an open slot 11, which is engaged by a pin 17 in the end of the arm 15, which is attached to the end of the rod 16. 19 represents the feed-gage piece, which is provided with numerals on its upper edge to indicate the length of stitch at which it is set. These numerals can be seen by the operator through the opening 20, Fig. 2, in the work-plate 2. The feed-gage piece 19 has a hollow post 22, Fig. 3, projecting from its rear side, and this post projects through the frame 3 of the machine, against which it is held by frictional contact through the spring-disk 23 and set-nuts 24 and 25. This frictional contact permits the gage-piece 19 to be easily set for any feed desired and to retain such position. The rod 16 before referred to passes through the hollow post 22 (see Fig. 3) and is held by the arm 15 at one end and the thumb-piece 26, pinned or otherwise secured to its other end. An intermediate spring 27 has one of its ends secured to the check-nut 25 and its other end to the thumb-piece 26 and is placed under sufficient tension to keep the upper side of the arm 15 on the opposite end of the rod 16 against the projection 21 on the gage-piece 19. By pressure on the thumb-piece 26, which is easily reached by the operator, being outside and below the side of the work-plate, the arm 15 can be depressed and moved away from contact with the pro-
jection 21 on the feed-gage piece 19 to the position shown in Fig. 4, where the rod 9 is in contact with a fixed pin 29 in the frame of the machine or other suitable limiting device, and since the pin 17 in the end of the arm 15 engages the open slot 11 in the feed-actuating rod 9 the free end of said rod is consequently raised or depressed with the arm 15. (See Figs. 1 and 2.) When thumb-piece 26 is released, the arm 15 through the action of the spring 27 is immediately returned to contact with the projection 21 on the feed-gage piece 19. The movement of the feed-dog 4 and length of stitch is determined by its connection through the carriage 5, pin 8, actuating-rod 9, and the lug 10 on said rod receiving movement from the rocker-rod 12, against which it is kept in contact by the reverse-acting spring 7 and the post 6. The lug 10 receives more motion, and consequently the feed is longer (twelve stitches to the inch) when the lug 10 is raised to a point near the free end of the rocker-rod 12. When the lug 10 is depressed to a point near the pivotal end of the rocker-rod 12, the feed will be shorter (thirty stitches to the inch). It follows then from this construction that through the action of the spring 27 the arm 15 if free will be kept in contact with the projection 21 of the adjustable gage 19, by which the length of the stitch is determined. When it is desired to finish the end of the seam, as already set forth, pressure on the thumb-piece 26 will move the arm 15 away from the projection 21 and it may be depressed, carrying the rod 9 with it, until a notch 28 on said rod 9 engages the fixed pin 29, Fig. 2, and the forward and backward movement of the feed-dog will be stopped. Releasing the thumb-piece 26, the arm 15 will return to contact with the projection 21 on the gage 9 and the length of stitch for which the gage is set will be resumed. When the depression 28 on lower side of the rod 9 is brought down to the pin 29, the lug 10 will be held back against the action of the spring 7 and sufficiently removed from contact with the rocker-rod 12 not to receive any motion therefrom. In Figs. 5, 6, and 7 I show a different mechanism for pressing the feed-dog carriage back against its spring and so stopping the forward and backward feed action, which requires no change in the construction of the feed device used on the present Willcox & Gibbs machine. Taking advantage of an opening 35 in the side of the feed-dog carriage 5 as now made, I place an extended bearing 30 in the frame 3 of the machine for the shaft 31. On one end of the shaft 31 and in the opening 35 I provide the cam or arm piece 32 and on the other end of the shaft 31 the operating-arm 33. When the arm 33, Fig. 7, is depressed, the cam 32, Fig. 6, does not interfere with the full action of the feed-dog carriage and feed-dog 4; but when the arm 33 is raised toward the driving-shaft 18' the cam 32 is brought in contact with the feed-dog carriage 5 and presses it back against the spring 7, carrying with it through the pin 8 the actuating-rod 9 and its lug 10, through which it receives movement from the rocker-rod 12, pivoted at 14 to the frame and actuated at its free end by the eccentric 18 on the driving-shaft 18'. It follows that with the feed-dog carriage held against the resilient action of the spring 7 and the lug 10, freed from the influence of the vibrating rocker-rod 12, the forward and backward movements of the feed-dog 4, attached to the carriage 5, will be stopped, no movement of the goods takes place, and consequently the needle will penetrate the same hole as many times as may be desired. Since only two to four stitches are required to finish the end of the seam, in order to assist in stopping the driving-shaft 33 at the same time a friction-spring 34 may be placed on the arm 33. As the arm is lifted the spring comes in yielding contact with the driving-shaft and acts as a brake. The frame 3 and shaft 12, Fig. 7, limit the range of movement of the arm 33. The arm 33 may be kept against the frame 3, in which position the cam 32 will not interfere with the movements of the feed-dog carriage in any suitable way. In the construction shown gravity is relied upon for this purpose. The brake-spring 34 may be used with either structure of device for holding the feed-carriage against movement by its spring, although I have shown the same in connection only with the form of mechanism illustrated in Figs. 5, 6, and 7 of the drawings.

I claim as my invention—

1. The combination, with the stitch-forming mechanism, of a single-thread sewing-machine having a reciprocating feed device receiving a positive forward movement from the driving-shaft of the machine and a backward movement from the action of the spring, and an adjustable gage for determining the length of said movements, of means independent of the gage for stopping said feed movements without changing the position of said gage and during the running of the machine by checking the action of said spring.

2. The combination, with the stitch-forming mechanism, of a single-thread sewing-machine having a reciprocating feed device receiving a positive forward movement from the driving-shaft of the machine and a backward movement from the action of the spring, and an adjustable gage for determining the length of said movements, of means independent of the gage for relieving said device from its forward actuating mechanism and stopping its feed action without stopping the machine or changing the position of said gage.

3. The combination, with the stitch-forming mechanism of a single-thread sewing-machine, of a feed device having an actuating-
rod 9 provided with an open slot 11, with a
lug 10 and with a recess 28, the movable arm
15 provided with the pin 17 engaging said
slot, the pin 29 on the frame of the machine
adapted to be engaged by the recess 28, the
rocker-arm 12 engaging said lug 10, and means
for operating said rocker-arm, substantially
as and for the purpose set forth.

4. The combination, with the stitch-form-
ing mechanism of a sewing-machine, of a feed
device having an actuating-rod 9 provided
with an open slot 11 and with a lug 10, the
rocker-arm 12 engaging the lug 10 and having
its free end actuated by an eccentric on the
driving-shaft of the machine, the shaft 16 pro-
vided at one end with the thumb-piece 26 and
at its opposite end with the arm 15 carrying
the pin 17 that engages said slot, the spring
27 surrounding the shaft 16 and through it
acting upon the arm 15, and an adjustable gage
19 against which, at 21, the arm 15 is held by
said spring 27, substantially as and for the
purpose set forth.

5. The combination, with the stitch-form-
ing mechanism of a single-thread sewing-
machine, of a feed-dog carriage 5, its pivotal pin
6 and intermediate spring 7 by which said
carriage is kept, through intermediate mech-
anism, in unbroken contact with an actuating-
eccentric on the driving-shaft of the machine,
an adjustable gage for determining the move-
ments of the feed-dog carriage and means in-
dependent of said gage for breaking said con-
tact, when desired, by holding said carriage
against the action of said spring, as and for
the purpose set forth.

6. In a single-thread sewing-machine feed,
the combination, of a feed-bar held by spring-
pressure in unbroken contact, through inter-
mediate mechanism, with and actuated in all
its movements by a single eccentric on the
driving-shaft, and an adjustable gage by
which the movements of the feed-bar are de-
termined with means independent of said
gage for breaking at will and during the op-
eration of the machine, the contact by which
said feed-bar receives and makes a forward
and backward movement, as and for the pur-
pose set forth.

7. In a single-thread sewing-machine feed,
the combination, of a feed-bar held by spring-
pressure in an unbroken contact, through inter-
mediate mechanism, by which it receives
a forward and backward movement, with an
actuating-eccentric, an adjustable gage by
which said movements are determined and
means independent of said gage for breaking
said contact when desired and during the op-
eration of the machine, as and for the pur-
pose set forth.

In witness whereof I have hereunto set my
hand this 7th day of November, 1904.

JOHN BIGELOW.

Witnesses:

C. G. HANSON,
A. C. PAUL.